REMARKS

Favorable reconsideration of this application is respectfully requested.

Claims 138-197 are present in this application. Claims 149-160 and 168-181 are allowed. The Applicants greatly appreciate the allowance of these claims. Claims 138-145, 161, 162 and 186-192 stand rejected under 35 U.S.C. § 102(b) over U.S. 5,503,704 (Bower et al).

Claims 146-148, 163-167, 182-185 and 193-197 are objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form. The Applicants greatly appreciate the finding that these claims recite patentable subject matter.

Claims 182-185 are amended to change the dependency from 138 to 168. This is a simple typographical error and entry of this amendment is respectfully requested.

As was explained in the last response, Bower et al does not contain any disclosure or suggestion of a method as recited in claim 138 or 186 which each recite "cleaning said first surface after exposure to said plasma." As shown in figure 1, the ammonia plasma activation in either step 40a or 40b occurs prior to bonding step 45. Further, the cleaning steps 15a and 15b occur prior to the respective plasma activation steps 40a and 40b. The Office Action points to two portions in Bower et al to argue that a process is disclosed where the ammonia plasma activation occurs prior to cleaning. However, Bower et al does not disclose or suggest this order of steps, and, in fact, only teaches that the plasma activation occurs after the cleaning step.

The Office Action first refers to column 5, lines 34-37 in arguing Bower et al discloses "an ammonia plasma activation, which can be employed during deposition prior to cleaning, as well as some later point in time, therefore, achieving a cleaning step after the plasma activation prior to bonding." As explained in the summary of the invention in column 2 and in the abstract, the process disclosed in Bower et al is designed to render a material

surface hydrophilic and reactive, and the surface is then direct bonded to a second surface (preferably also hydrophilic and reactive). Turning to column 5, in lines 12-22, the material undergoes ammonia plasma activation where "[a]t the end this step, the material surface will be both hydrophilic and reactive for low temperature direct bonding." This is illustrated in step 40a and the material surface is then brought in to physical contact with a second hydrophilic and reactive surface in step 45 to form an initial bond.

Turning to lines 33-37, referenced in the Office Action, these lines state that the ammonia plasma activation can be employed as a step in the deposition of a nitride layer as well as at some point later in time. In this case, the plasma deposition utilizes NH_3 and SiH_4 to deposit a silicon nitride layer. The SiH_4 is then shut down and the plasma is reduced to NH_3, which renders the nitride layer hydrophilic and reactive for low temperature bonding.

In these lines is described the process where a plasma is used to both deposit a nitride layer and to render hydrophilic the nitride layer. There is absolutely no discussion of any cleaning step performed after the plasma process. The statement in the Office Action that the ammonia plasma activation can be employed "prior to cleaning" is without support. Nowhere in these lines is there any suggestion of a cleaning process performed after the plasma process. To the contrary, once the plasma process occurs the nitride layer is ready for bonding and, as shown in figure 1, after plasma step 40a or 40b bonding occurs without any intervening cleaning step.

The Office Action also argues, without support, that column 4, lines 45-67 and the abstract disclose cleaning the surface after exposure to the plasma by removing contaminants from the surface. Column 4 lines 45-67 describe step 15a where the surface is cleaned. As shown in figure 1, step 15a occurs prior to either of steps 40a or 40b. Column 5 beginning at line 1 also describes how steps 40a and 40b occur after steps 15a or 15b. The abstract contains no disclosure or suggestion of cleaning, or any disclosure or suggestion of when a

cleaning step should take place. Thus, the abstract and column 4, lines 45-67 do not describe or suggest a process where cleaning the surface occurs after exposure to plasma but in fact confirms that the opposite is true, i.e., that cleaning occurs prior to exposure to plasma. The rejection is not supported by Bower et al and thus cannot be used to reject either of claims 138 or 186 which recite cleaning the surface after plasma activation.

The Office Action also refers to the general statement in column 4, lines 29-31 where "the steps and their sequence may vary without departing from the basic concepts as disclosed herein." However, there is clearly no suggestion of any cleaning step prior to the plasma step, as the only example is shown in figure 1 and has cleaning steps 15a or 15b being performed prior to plasma activation steps 40a or 40b. The Bower et al patent only discloses a process where the material surface is rendered hydrophilic and then is low temperature direct bonded. Nowhere does Bower et al disclose or suggest that it is possible to perform a cleaning step after a plasma activation, or that a surface is ready for low temperature direct bonding after a cleaning step. The Office Action has made no case that Bower et al discloses or suggests such a method, and thus the arguments supporting the rejection fail.

According, as Bower et al does not disclose or suggest the method as recited in either of claims 138 or 186, it is respectfully submitted that the present application is in condition for allowance and a favorable decision to that effect is respectfully requested.

Respectfully submitted,

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